ARKLOW HARBOUR.

RETURN to an Order of the Honourable The House of Commons, dated 20 April 1885;—*for*,

COPY "of REPORT of the Engineer to the Commissioners of Public Works in *Ireland* upon the Condition of the WORKS at ARKLOW HARBOUR."

Treasury Chambers, 20 April 1885.

JOHN T. HIBBERT.

REPORT on the present Condition of ARKLOW HARBOUR WORKS.

AT the close of the year 1884 the Southern Pier had been carried out for 458 feet out of a total length of 700 feet; the outer end had been closed in with a concrete wall, only a part of the wharf wall at the land end had to be built, and the structure was considered to be safe from the attacks of the sea till the works could be carried on at the commencement of the present season.

On the 4th January a report was received from the Superintendent of the works that on the previous day he observed cracks in the parapet of the sea wall, and that some of the face blocks had moved out. The principal Assistant Engineer was at once despatched to the Harbour, which he visited on the 5th, and reported that for 90 feet in length (of the 458 feet constructed) the face blocks had moved out from 2 inches to 20 inches, and had sunk a few inches, and that the sand had been scoured away from along the sea face of the Pier.

Immediate orders were given to have a shoeing course of heavy blocks deposited at the base of the sea slope. This work was at once proceeded with, but with very great difficulty, in consequence of the state of the sea and of the weather.

I visited the work myself on the 6th of February, when it was in the same state as reported by Mr. Greene, and although it was to be regretted that any damage whatever had been done; still the amount of it was comparatively little, and its repair presented no difficulty, but it was obvious that the sand foundations had been scoured out, and I ordered the protection to the toe of the sea slope to be carried on as quickly as possible, so as to prevent further damage. Up to the end of the month the weather was very bad, the sea frequently breaking over the parapet and preventing the continuance of the work; in fact, there were only two days between the 2nd January and 21st February on which blocks could be laid at the toe of the sea slope, and on the 3rd March fresh subsidence was reported. On the 9th March, Mr. Henry Keating, Assistant Engineer, was sent to Arklow to make a survey, but the weather was not sufficiently moderate to enable him to take soundings till the 14th and 16th of that month. This survey shows that for about 130 feet in length the sea slope had been more or less damaged, and that the sand foundations had been scoured out by the sea, forming a trench parallel with the pier from 40 to 50 feet wide, and of an average depth of about 6 feet under the previous level of the bed of the sea. I may here remark that the Contractor took soundings at the end of November, at which time no scour had taken place, so that the damage must have occurred during the storms of the months of December, January and February.

I again visited the harbour on the 31st March; I carefully examined the entire work going along the sea side of the pier in a boat, and afterwards descending by a ladder over the parapet, closely inspecting the sea face, especially the two places where most subsidence had taken place, each of these being about 20 feet in length.

I was glad to observe that the damage was confined to the displacement and subsidence of the face blocks, and to some cracks in the parapet and the upper part of the sea wall set *in situ*.

In consequence of the state of the weather (before mentioned) a length of about 70 feet was unprotected by blocks or rubble till after the damage was done. I ordered that rubble should be deposited for the entire length of the injured part. Up to the present, 900 cubic yards have been placed, and I do not anticipate any further damage taking place before the state of the sea and weather will permit the repairs to be undertaken. I need not here enter into more detail; it is sufficient to say that the damages described are to be entirely attributed to the scouring out of the sand already described, and which extended under the foundations of the storm-wall for its entire width of 19½ feet.

From the examination which I have made I consider it will be prudent to take precautions for the protection of the part of the work still to be constructed beyond those which at first appeared to be necessary.

I have carefully considered the whole matter, and I am confirmed in my previous opinion, that an additional sum will be required for the completion of the work over and above that provided, and which I now estimate at 1,500 *l.*

I consider Arklow as one of the most important fishing stations on the coast of Ireland, and I do not wonder that persons interested in it view with great apprehension any indication of failure in providing the accommodation so much required, especially when they have had the experience of the total destruction of works erected on the same site, and also of the large and unprofitable expenditure which had taken place at Wicklow before the construction of the present pier.

It would answer no good purpose were I to reply to all the statements which have been put forward from time to time as to Arklow Harbour; I may, however, be permitted to state some of the facts connected with it.

For more than 40 years reports have been made on the harbour by several engineers of eminence, and although, as might be expected, they differ from one another, in some respects they all concurred that the main difficulties to be surmounted were, first, the construction of works founded on sand, open for half the compass to the most dangerous winds in the Irish Sea, which would be capable of withstanding the force of the sea in this exposed situation; secondly, the prevention of the silting up of the entrance which occurred periodically, and which prevented ingress or exit sometimes for weeks together. In one respect the agreement among the engineers who reported was general, namely, in the position of the piers and that of the entrance, the several plans being practically the same. The last of these Reports was made by Mr. A. M. Rendel, M. Inst. C. E. (in the year 1869), for the present Earl of Carysfort, one of the principal proprietors of the town of Arklow.

He states the general belief that the bar will follow any extension of the piers short of where the marl is clear of sand, at about a quarter of a-mile from the shore, in five fathoms of water; and states his opinion, "that the disturbance of the sand by the waves takes place chiefly between the point where they commence to break and the shore;" and he adds, "I am satisfied if the piers were pushed out into a depth of two-and-a-half fathoms at low water of spring tides, they would be placed so far beyond the line of the chief disturbance as to insure a minimum depth of at least 10 feet at low water."

He proposed an extension of the southern pier or breakwater for a length of 400 feet, to be built of concrete blocks founded on the sand, to about the level of half-tide, and above that level in rubble masonry set in cement. In the pier now under construction concrete blocks are used up to high water of ordinary spring tides, and concrete *in situ* above that level.

The length of the pier is intended to be 110 feet more than that proposed by Mr. Rendel.

I am very unwilling to refer at all to works which are not under the direction of this Board, but as those recently constructed at Wicklow have been prominently brought forward for comparison with those at Arklow, I may be allowed to state that it is scarcely possible to conceive any two cases which are so dissimilar.

The facts respecting Arklow have already been stated: those at Wicklow are as follow:—

The pier is founded on rock or strong marl bottom, and the level of the bed of the sea is constant, as ascertained by Admiralty soundings. The natural

trend

trend of the coast protects the works from south to south-east winds, which on the east coast of Ireland are the most violent and dangerous, and to which such part of the pier as has any exposure whatever is nearly parallel. As to the method of construction, it is described in Mr. Strype's evidence before the Committee on Harbour Accommodation (1884), p. 151, and is illustrated by a lithographed plan. The width of the pier is only 36 feet at the base and 30 feet at high water. It is unnecessary for me to say more than, whatever the merits of this structure may be, and I do not desire to discuss them, it would be quite impossible to adopt such a method of construction at Arklow, any attempt to do so would certainly end in failure.

For many years solid piers have been built in several places. I have constructed two myself, and have used concrete *in sitû* whenever it was possible to do so, but in exposed places, even where the foundation is good it is difficult to adopt that method within the limits of the funds available.

It has been stated that the mode of construction adopted at Arklow was objected to by the members of a local committee; I have only to state in reply, that for the nine years during which I have been engaged on the subject of the design and erection of Harbour Works at Arklow, I have never upon any occasion received any suggestion of the kind from anyone. In the year 1882, I received by the Board's order a deputation composed of some members of a local committee; their objections to the plan were confined to the position of the piers and of the entrance, and to their apprehensions of the sand following out the pier as it was built, and still continuing to block up the entrance as had always previously been the case.

My Report upon that conference, together with a copy of their objections furnished to the Board, and an opinion thereon obtained by Colonel Tighe (on the part of the local committee), from the Hon. Captain Crofton, R.N., Harbour Master at Kingstown, were submitted to the Board at the time.

15 April 1885. (signed) *Robert Manning*, M. Inst. C.E.,
Chief Engineer.

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(*Mr. Hibbert.*)

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